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09/619,371	07/19/2000	Patrick J. Treado	000537	2198

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EXAMINER
AMARI, ALESSANDRO V

ART UNIT	PAPER NUMBER
2872	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/619,371	Applicant(s) TREADO ET AL.	
	Examiner Alessandro V. Amari	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-10,12-18,20-25 and 27-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,18,20-22,28-41 and 44-51* is/are rejected.

7)☒ Claim(s) *3-10,12-17,23-25,27,42 and 43* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 3-10, 12-17, 23-25, 27, 28-41, 42, 43, 44-51 are objected to because of the following informalities:

Claims 3-10, 12-17, 23-25, 27, 42, 43 are dependent on claim 1 which has been canceled but for the purposes of examination will be treated as dependent on claim 2.

Regarding claims 28, 48, 50 and 51, the phrase "can be" renders the claims ambiguous because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 2, 18, 20, 28, 29-35, 44, 48 and 49 are rejected under 35 U.S.C. 102(e) as being anticipated by Wach et al. U.S. Patent 6,222,970.

In regard to claims 2 and 28, Wach et al. discloses (see Figures 27A, 27B and 27C) a chemical imaging fiberscope for the collection of a chemical image derived from the Raman spectra reflected from a sample comprising: one or more laser illumination fibers (2710) for transmitting laser light of a specific laser excitation wavelength from a first source to said sample; a coherent fiber bundle (2715) capable of transmitting a clear image of said sample based on light scattered, reflected or emitted from said sample as described in column 28, lines 18-30 and column 36, lines 45-48 and as shown in Figures 27A and 27C; a spectral filter positioned between said one or more laser illumination fibers and said sample for transmitting said laser light of a specific laser excitation wavelength and rejecting light of other wavelengths as described in column 53, lines 9-15; and a spectral filter positioned between said sample and said coherent fiber bundle for transmitting images comprising wavelengths of light other than said specific laser excitation wavelength wherein said coherent fiber bundle can be positioned and focused with respect to said sample using light collected by said coherent fiber bundle as described in column 53, lines 15-24.

In regard to claims 18 and 48, Wach et al. discloses (see Figures 27A, 27B and 27C) a chemical imaging fiberscope for the collection of a chemical image derived from Raman spectra reflected from a sample comprising one or more laser illumination fibers (2710) for transmitting laser light of a specific laser excitation wavelength from a first source to said sample; a coherent fiber bundle (2715) capable of transmitting a clear

image of said sample based on light scattered, reflected or emitted from said sample; a spectral filter positioned between said one or more laser illumination fibers and said sample for transmitting said laser light of a specific laser excitation wavelength and rejecting light other wavelengths as described in column 53, lines 9-15; a spectral filter positioned between said sample and said coherent fiber bundle for transmitting wavelengths of light other than said specific laser excitation wavelength as described in column 53, lines 15-24; a spatial filter positioned between said sample and said coherent fiber bundle for controlling the angular field of view of said collection fibers as described in column 34, lines 58-61; one or more lenses positioned between said sample and said plurality of collection fibers as described in column 61, lines 11-25; a housing for enclosing the fiberscope as described in column 29, lines 52-53; and a window disposed at the distal end of said fiberscope wherein said coherent fiber bundle can be positioned and focused with respect to said sample using light collected by said coherent fiber bundle as described in column 30, lines 15-18.

Regarding claims 3, 20, 29 and 49, Wach et al. discloses that the spectral filters exhibit environmental sensitivity to temperature and humidity as described in column 62, lines 53-67 and column 64, lines 64-67 and column 65, lines 1-23.

In regard to claim 4 and 30, Wach et al. discloses (see Figure 2B) one or more lenses positioned between said sample and said coherent fiber bundle for focusing said image on said coherent fiber bundle as described in column 61, lines 11-25.

In regard to claim 5 and 31, Wach et al. discloses (see Figure 27B and 27C) a housing for enclosing the fiberscope as described in column 29, lines 52-53.

In regard to claim 6 and 32, Wach et al. discloses a window disposed at the distal end of said fiberscope in column 30, lines 15-18.

In regard to claim 7 and 33, Wach et al. discloses that the window is composed of a material selected from a group comprising quartz, diamond and sapphire as described in column 30, lines 15-18.

In regard to claim 8 and 34, Wach et al. discloses that the laser spectral filter is spatially patterned into a first portion for filtering said laser light and a second, transparent portion for transmitting light scattered or reflected by said sample to said coherent fiber bundle as described in column 53, lines 9-22.

In regard to claim 9 and 35, Wach et al. discloses that the spectral filters are composed of a filter type selected from a group comprising dielectric, holographic and rugate spectral filters as described in column 72, lines 50-53 and column 81, lines 5-8.

In regard to claim 43 and 44, Wach et al. teaches a spatial filter positioned between said sample and said coherent fiber bundle for controlling the angular field of view of said collection fibers as described in column 34, lines 58-61.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 10, 12-17, 21, 22, 27, 42, 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wach et al. U.S. Patent 6,222,970 in view of Katoot U.S. Patent 6,091,872.

In regards to claims 10, 21,22, 50 and 51, Wach et al. teaches the invention as set forth above and (see Figures 27A, 27B and 27C) a chemical imaging fiberscope for the collection of a chemical image derived from Raman spectra reflected from a sample comprising one or more laser illumination fibers (2710) for transmitting laser light of a specific laser excitation wavelength from a first source to said sample; a coherent fiber bundle (2715) capable of transmitting a clear image of said sample based on light scattered, reflected or emitted from said sample; a spectral filter positioned between said one or more laser illumination fibers and said sample for transmitting said laser light of a specific laser excitation wavelength and rejecting light other wavelengths as described in column 53, lines 9-15; a spectral filter positioned between said sample and said coherent fiber bundle for transmitting wavelengths of light other than said specific laser excitation wavelength as described in column 53, lines 15-24; a spatial filter positioned between said sample and said coherent fiber bundle for controlling the angular field of view of said collection fibers as described in column 34, lines 58-61; one or more lenses positioned between said sample and said coherent fiber bundle as described in column 61, lines 11-25; a housing for enclosing the fiberscope as described in column 29, lines 52-53; and a window disposed at the distal end of said fiberscope as described in column 30, lines 15-18 wherein said coherent fiber bundle can be positioned and focused with respect to said sample using light collected by said

coherent fiber bundle. Regarding claim 12, Wach et al. teaches that the spectral filters exhibit environmental sensitivity to temperature and humidity as described in column 62, lines 53-67 and column 64, lines 64-67 and column 65, lines 1-23. Regarding claim 13, Wach et al. discloses (see Figure 2B) one or more lenses positioned between said sample and said coherent fiber bundle as described in column 61, lines 11-25. Regarding claim 14, Wach et al. discloses (see Figure 27B and 27C) a housing for enclosing the fiberscope as described in column 29, lines 52-53. Regarding claim 15, Wach et al. discloses a window disposed at the distal end of said fiberscope in column 30, lines 15-18. Regarding claim 16, Wach et al. discloses that the window is composed of a material selected from a group comprising quartz, diamond and sapphire as described in column 30, lines 15-18. Regarding claims 17 and 42, Wach et al. teaches that the laser spectral filter is spatially patterned into a first portion for filtering said laser light and a second, transparent portion for transmitting light scattered or reflected by said sample to said coherent fiber bundle as described in column 53, lines 9-22. Regarding claim 27, Wach et al. teaches a spatial filter positioned between said sample and said coherent fiber bundle for controlling the angular field of view of said coherent fiber bundle as described in column 34, lines 58-61.

However, Wach et al. lacks a teaching of a plurality of white light illumination fibers for transmitting white light from a second source to said sample.

Regarding claim 10, 21, 22, 50 and 51, Katoot teaches a teaching of a plurality of white light illumination fibers for transmitting white light from a second source to said sample as described in column 6, lines 50-67 and column 7, lines 1-18.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the plurality of white light illumination fibers as taught by Katoot in the fiberscope of Wach et al. in order provide capability for viewing objects.

6. Claims 36-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wach et al. U.S. Patent 6,222,970 in view of Katoot U.S. Patent 6,091,872.

In regard to claim 36, Wach et al. teaches the invention as set forth above and further teaches that in regard to claim 37 that the spectral filters exhibit environmental sensitivity to temperature and humidity as described in column 62, lines 53-67 and column 64, lines 64-67 and column 65, lines 1-23. In regard to claim 38, Wach et al. teaches (see Figure 2B) one or more lenses positioned between said sample and said coherent fiber bundle as described in column 61, lines 11-25. In regard to claim 39, Wach et al. teaches (see Figure 27B and 27C) a housing for enclosing the fiberscope as described in column 29, lines 52-53. In regard to claim 40, Wach et al. teaches a window disposed at the distal end of said fiberscope in column 30, lines 15-18. In regard to claim 41, Wach et al. teaches that the window is composed of a material selected from a group comprising quartz, diamond and sapphire as described in column 30, lines 15-18. However in regard to claim 36, Wach et al. lacks a teaching of a plurality of white light illumination fibers for transmitting white light from a second source to said sample. Katoot teaches a teaching of a plurality of white light illumination fibers for transmitting white light from a second source to said sample as described in column 6, lines 50-67 and column 7, lines 1-18. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the plurality of

white light illumination fibers as taught by Katoot in the fiberscope of Wach et al. in order provide capability for viewing objects.

7. Claims 23 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wach et al. U.S. Patent 6,222,970 in view of Alfano et al. U.S. Patent 6,006,001.

In regard to claims 23 and 45, Wach et al. teaches the invention as set forth above but does not teach a mount for holding the fiberscope distal end in proximity to said sample; a link for directing the output of the fiberscope under white light illumination conditions to a live video camera; a link for directing the output under laser illumination conditions to a Raman spectrometer; a link for directing the output under laser illumination conditions to a Raman chemical imaging spectrometer and detector. Alfano et al. teaches (see Figure 6) a mount (30) for holding the fiberscope distal end in proximity to said sample; a link (73) for directing the output of the fiberscope under white light illumination conditions to a live video camera; a link (52) for directing the output under laser illumination conditions to a Raman spectrometer; a link (52) for directing the output under laser illumination conditions to a Raman chemical imaging spectrometer and detector as described in column 8, lines 19-35. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the fiberscope assembly including video and spectrometer system of Alfano et al. with the fiberscope of Wach et al. in order to provide spectroscopic analysis.

8. Claims 24, 25, 46 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wach et al. U.S. Patent 6,222,970 in view of Alfano et al. U.S. Patent 6,006,001 and further in view of Cooney et al. "Remote Raman Microimaging Using an

AOTF and a Spatially Coherent Microfiber Optical Probe" Applied Spectroscopy, Volume 50, No. 8 (1996).

Regarding claims 24, 25, 46 and 47, the combination teaches the invention as set forth above, but does not teach that the imaging spectrometer is of the liquid crystal tunable filter type or software and hardware for producing and displaying a Raman image of a sample. Cooney et al. teaches software and hardware for producing and displaying a Raman image of a sample as shown in Figure 1 and also discloses an imaging spectrometer being of the liquid crystal tunable filter type as described in column 1, lines 25-33. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the liquid crystal tunable filter spectrometer of Cooney et al. in the fiberscope of Wach et al. in order to allow for acquisition of Raman images.

Response to Arguments

9. Applicant's arguments filed 14 June 2002 have been fully considered but they are not persuasive.

Applicant argues that the limitation "coherent fiber bundle capable of transmitting an image" renders all claims as distinguishable over Wach et al. because Wach et al. does not disclose (1) using a fiber bundle having enough fibers to transmit a high quality image, but only a fiber bundle containing 6 or 7 fibers; and (2) using a coherent fiber bundle which means that the fibers are well organized and aligned at both ends of the bundle to be able to transmit the high quality image.

In response to this argument, Applicant is directed to Wach et al., column 28, lines 30-60 which describe a bundle of fibers bound together. Applicant is further directed to column 36, lines 45-48 which teaches that these bundles can be used for imaging applications and are therefore organized and aligned at both ends of the bundle in order to transmit a high quality image.

The Applicant further argues that Wach et al. does not teach focusing an image onto a coherent fiber bundle but instead teaches a lens having an offset axis for steering the collection pattern and the delivery of light pattern off-axis.

In response to this argument, Applicant is directed to Wach et al., column 56, lines 52-54 and Figure 69 which teach lenses (6940, 6955) positioned between the sample and the coherent fiber bundle for focusing an image onto the fiber bundle.

Applicant further argues that Wach et al. does not teach a spatially patterned filter spatially patterned to perform multiple functions but instead discloses two separate filters.

In response to this argument, the Applicant's attention is directed to Wach et al., column 53, lines 9-19 and specifically, lines 16-17 which teaches, "collection fibers 6380 should also be filtered; **although, this is often not a requirement**." This is also taught in column 75, lines 13-19 of Wach et al. Therefore, Wach et al. does indeed teach a spatially patterned filter patterned as claimed.

Applicant further argues that Wach et al. only discloses a rugate type filter and not a dielectric or holographic type filter.

In response to this argument, Applicant is reminded that the rejection is based upon the claim recitation. Claim 9 recites: spectral filters composed of a filter type selected **from a group** comprising dielectric, holographic or rugate type filters." Since rugate type filters are part of the group, the prior art reads on the claim.

Applicant further argues that the prior art, Alfano et al. only teaches the use of the assembly for optical spectroscopy and not for chemical imaging. Applicant further argues that the small number of collection fibers is not suitable for the collection of white light images or Raman chemical images. Also, Applicant argues that there is no link to an imaging component.

In response to this argument, the Applicant's attention is directed to Alfano et al., column 1, lines 20-22 which states, "This work has demonstrated that optical spectroscopy can be used to provide useful information about both the **chemical composition** and the morphological structure of biological tissues and materials." Furthermore, both Wach et al. and Alfano et al. make extensive references to collection of Raman chemical images (see Wach et al., column 1, lines 60-67 and column 2, lines 1-9 and Alfano et al., column 1, lines 55-65 and response to argument on coherent fiber bundle above). Applicant's attention is further directed to Figure 6 of Alfano et al. which clearly shows a link to an imaging component (see box at top which states "Viewing modalities (video camera, observer's eye, etc.)").

Applicant further argues that the prior art, Cooney teaches away from using liquid crystal tunable filters but instead teaches the use of acousto-optic tunable filters (AOTFs).

In response to this argument, the Examiner would like to point out that Cooney explicitly teaches that liquid crystal tunable filters have been used in Raman imaging spectrometers (see Cooney, page 1, column 1, lines 12-15). Therefore, the reference meets the limitations of the claims.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703) 306-0533. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on (703) 308-1687. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ava *avq*
September 12, 2002

Cassandra Spyrou
Supervisory Patent Examiner
Technology Center 2800